GPS Status and Modernization

Munich Satellite Navigation Summit
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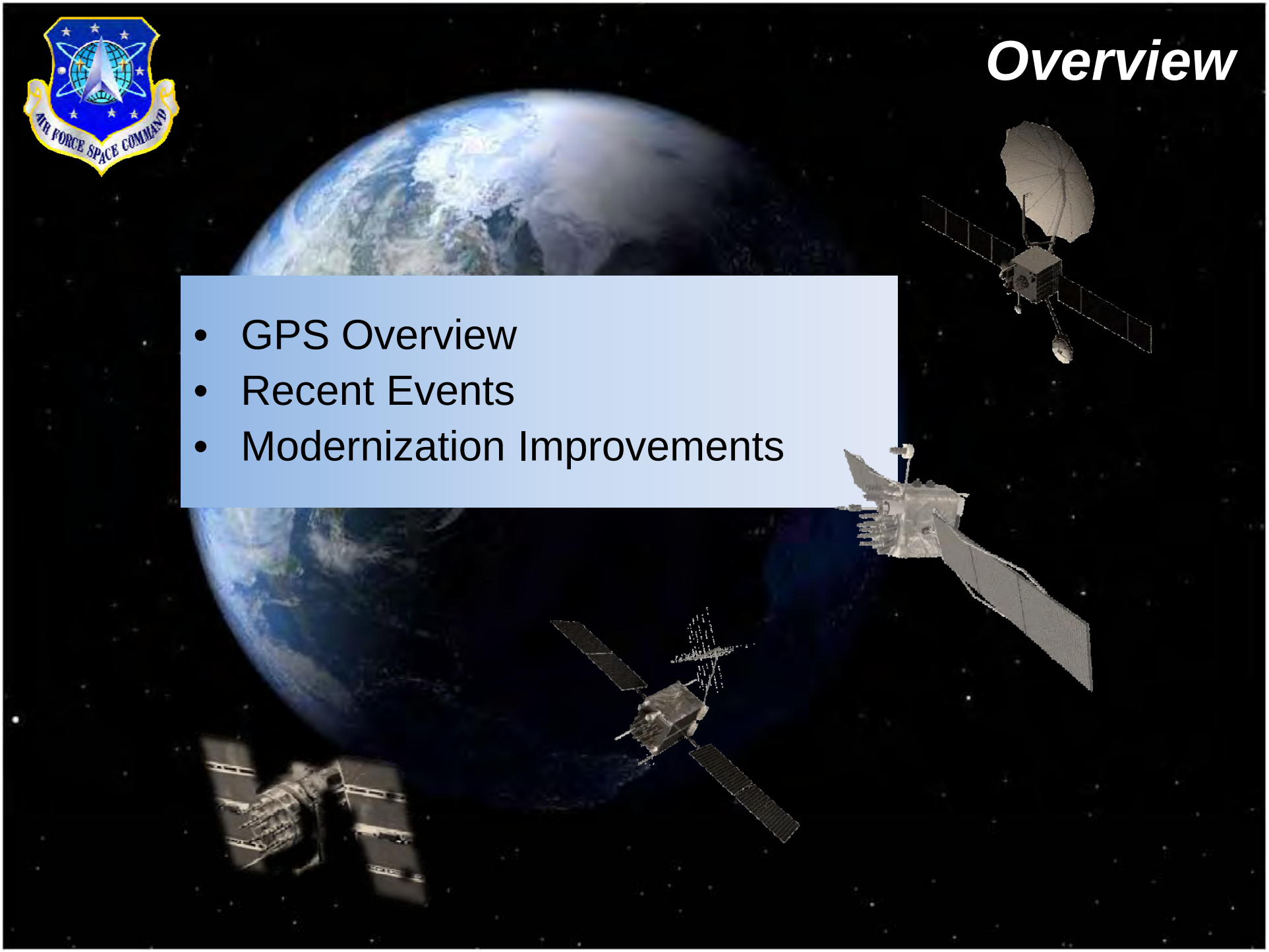
Overview

- GPS Overview
- Recent Events
- Modernization Improvements



Critical Asset

- Vital to International Security, Economic Growth, and Public Safety
- Extends across all domains -- air, land, sea, space, cyberspace
- Effects transcend national and military boundaries

Available, reliable, accurate, and free of charge

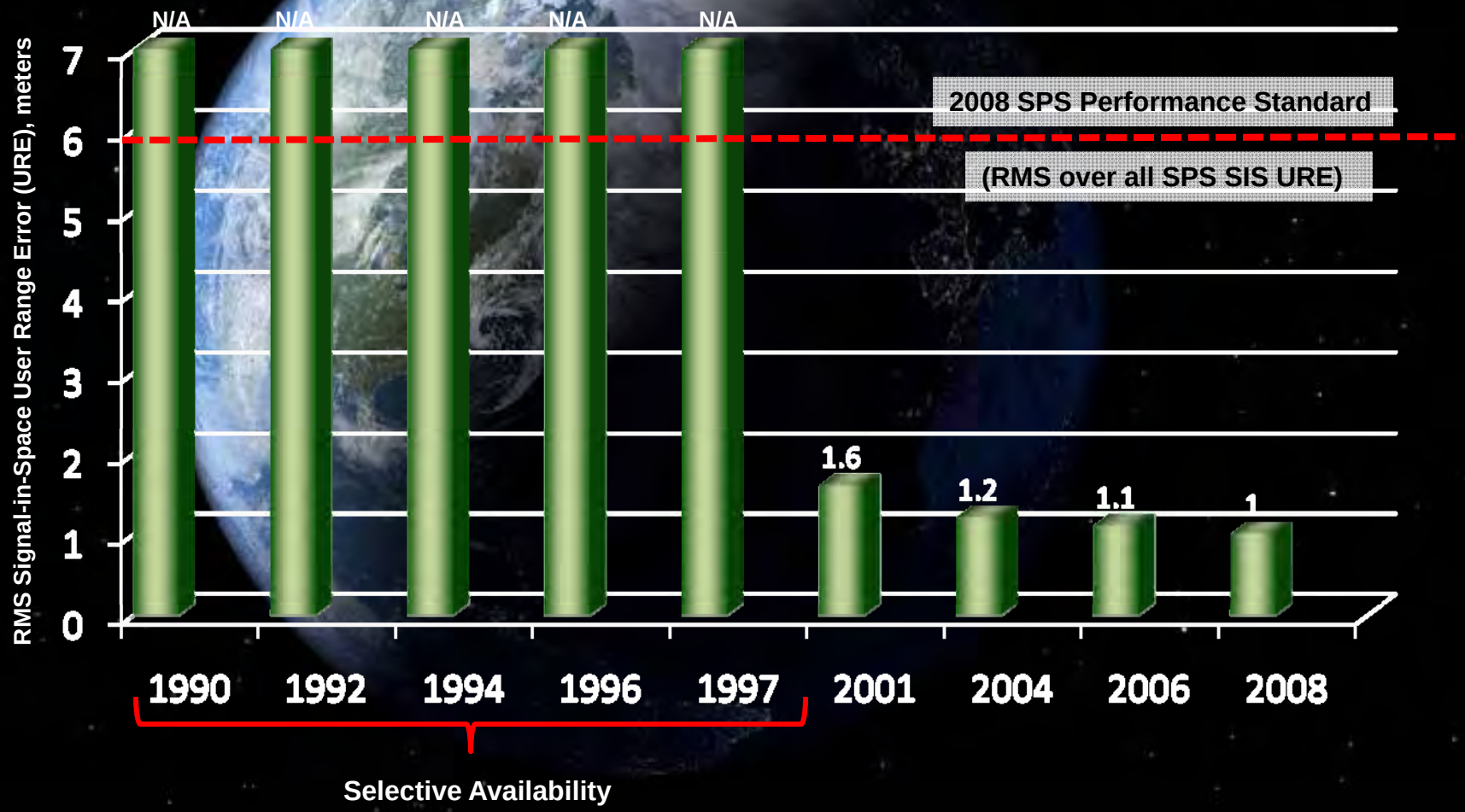
GPS – Serving the World

- Very robust constellation
  - 31 satellites currently in operation
    - 11 GPS IIA
    - 12 GPS IIR
    - 7 GPS IIR-M
  - 4 additional satellites in residual status
  - 1 additional IIR-M waiting to be set healthy
- Global GPS civil service performance commitment met continuously since December 1993
- Next Launch – IIF-1, May 2010

GPS Control Segment

- Operated by Space Professionals in 2d Space Operations Squadron at Schriever AFB, CO
- Backup facility at Vandenberg AFB, CA
- Global monitoring and antenna networks

SPS Signal in Space Performance



System accuracy exceeds published standard

GPS Modernization – Space and Control Segments

	1995	2005	2010	2014 - 2025
Space Segment	**GPS IIA**	**GPS II R / IIR-M**	**GPS IIF**	**GPS III**
				

	• Standard Service
	  • Single frequency (L1)
	  • Coarse acquisition code navigation
	• Precise Service
	  • Y-Code (L1Y & L2Y)
		• IIA/IIR capabilities plus
		• 2nd civil signal (L2C)
		• M-Code (L1M & L2M)
			• IIR-M capability plus
			• 3rd civil signal (L5)
			• 12 year design life
				• Backward compatible
				• 4th civil signal (L1C)
				• Increased accuracy
				• Increased integrity

Control Segment	**Legacy Control System**	**Architecture Evolution Plan (AEP)**	**Next Generation Control Segment (OCX)**	

GPS Modernization – Ground

- Architecture Evolution Plan (AEP)
  - Transitioned in 2007
  - Modern distributed system replaced 1970's mainframes
  - Increased capacity for monitoring of GPS signals
  - Increased worldwide commanding capability
- Next Generation Control Segment (OCX)
  - Controls more capable GPS constellation
  - Monitors all GPS signals
  - $1.5B contract awarded 25 February 2010

GPS Modernization – New Civil Signals

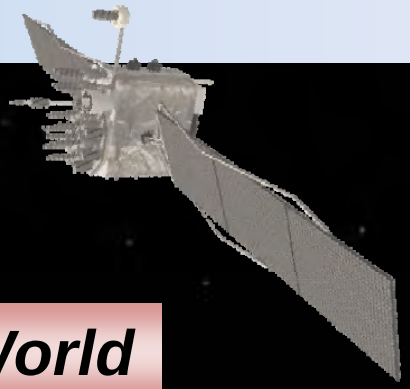
- Second civil signal “L2C”
  - Designed to meet commercial needs
  - Higher accuracy through ionospheric correction
  - 1st launch: Sep 2005 (GPS IIR-M); 24 satellites: ~2016
- Third civil signal “L5”
  - Designed to meet demanding requirements for transportation safety-of-life
  - 1st launch: ~ 2010 (GPS IIF); 24 satellites: ~2018
- Fourth civil signal “L1C”
  - Designed with international partners for GNSS interoperability
  - Begins with GPS Block III
  - 1st launch: ~2014; 24 satellites: ~2021

GPS Expandable

- Optimize GPS assets to improve operational effectiveness for global users & terrain challenged environments
  - Increase the number of vehicles over head for better availability/coverage
  - Constellation expansion feasible with robust number of satellites now on-orbit
- Consistent with the current Standard Positioning Service (SPS) Performance Standard
  - Adjust position of satellites in 3 of 6 orbital planes to create expanded constellation
  - Expanded constellation provides better GLOBAL coverage

Summary

- Largest constellation in history with best accuracy ever
- Modernized Command and Control System allows more signal monitoring and quicker satellite commanding than ever before
- Constant improvements through constellation management
- And we're continuing to modernize and improve GPS even more!



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